ESTIMATION OF DISEASE-SPECIFIC COSTS IN HEALTH INSURANCE CLAIMS:
A COMPARISON OF THREE METHODS

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Objective To compare the accuracy and validity of three different methods (Proportional Disease Magnitude method [PDM] with two different magnitude estimations: arithmetic means with correction by the authors; Proportional Allotment Estimator [PAE] by Tango; Maximum Likelihood Estimator [MLE] also by Tango) for estimating disease-specific costs in health insurance claims.

Methods Application of the three methods to a computer-generated simulation dataset whose disease-specific costs were known and to actual outpatient claims whose disease-specific costs were unknown.

Outcome measures For simulation data, the accuracy was assessed by correlation between known disease-specific costs and estimated disease-specific costs by the three methods. For actual claims, concurrent validity was assessed by inter-method correlations between pairs of the two methods.

Results All three methods showed good agreement and accuracy with the simulation data but marked disagreement when they applied to actual claims. MLE yielded an aggregate total of disease-specific costs exceeding the actual total by 21.3% and showed negative disease-specific costs in 18 out of 154 categories. Inter-method correlations showed that PDM with PAE and MLE correlated most strongly ($R^2=0.9022$) while the least correlation was observed for PDM with arithmetic means and MLE ($R^2=0.6861$).

Conclusion MLE is not usable for claims analysis but PDM yielded good estimates with two different methods of magnitude estimation using actual claims.

Key words: proportional disease magnitude method, proportional allotment estimator, maximum likelihood estimator, health insurance claims, econometrics, simulation

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